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The Dawn Redwood — *Dr. H. H. Hu*

The Rise and Fall of Sap — *August P. Beilmann*

September-October, 1948 *The Journal of American Arboriculture* Vol. 8—No. 6

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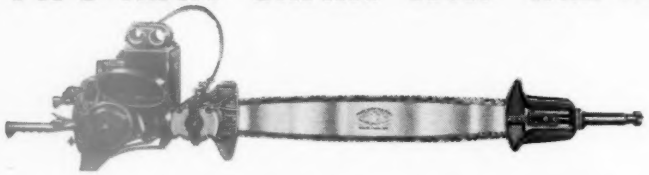

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ALONG THE WAY

With . . .
EDW. SCANLON

■ Just as I SAT DOWN in the backyard to START PENCILING this IMMORTAL COLYUM, I glanced up at a BIG BEAUTIFUL ELM in a yard TWO DOORS AWAY and there, TO MY HORROR, appeared a PERFECT SYMPTOM of DUTCH ELM DISEASE. (To be continued).

✡ ✡ ✡ ✡

■ *NORTHEASTERN OHIO, including CLEVELAND, AKRON, and YOUNGSTOWN are on the threshold of a DESTRUCTIVE DED EPIDEMIC. On the basis of INCOMPLETE RETURNS we have about 80 CONFIRMED CASES in CUYAHOGA COUNTY; and, I understand DICK BARNHART, park super in AKRON has 70 CASES. A DULL OUTLOOK indeed THAT CALLS for ACTION.*

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■ After that BLAST OF HOT AIR in MILWAUKEE, and I DON'T MEAN the SPEAKERS, it looks like someone has FLUNG A DOUBLE WHAMMY at the SHADE TREE CONFERENCE: 100 degree heat TWO YEARS RUNNING is enough.

✡ ✡ ✡ ✡

■ *Had a NICE VISIT with MR. and MRS. W. "HERB" WARREN, park supt. of VANCOUVER, B .C. The WARRENS are looking things over IN THE STATES on their way to the PARK EXECS CONFERENCE in BOSTON Oct. 5th.*

✡ ✡ ✡ ✡

■ Next time you are AROUND MILWAUKEE, looking for an EATING PLACE, call RUDY LOHMAN in WEST ALLIS, and ask him how to get to "SLOBBER-HAVEN." That's the WAY IT SOUNDS anyway.

✡ ✡ ✡ ✡

■ *'TWAS GOOD to see new faces FROM CALIFORNIA at the NSTC. LES MAYNE, arborist of San Mateo; JOHN MARASCO, park super of Beverley Hills, and RAY MORGAN, arborist of Santa Barbara. Of course ROG SOHNER was there as usual. TOO BAD some of the OTHER FACES were MISSING.*

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■ GEO. KELLY the DENVER GREEN THUMBER had a GOODLY NUMBER of his gang FROM COLORADO. If GEORGE KEEPS IT up he'll have the CONFERENCE IN DENVER some of THESE DAYS.

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■ *There were 31 DIFFERENT SPECIES named as the IDENTITY of the "MYSTERY" stump at the CONFERENCE. Eight WISE GUYS guessed the right answer—GINKGO BILOBA.*

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■ HI BALCH of the NORTH CAROLINA clan came up with the INTERESTING OBSERVATION that there were 7 REGISTRANTS at the conference who lived on STREETS NAMED FOR TREES, and one FROM A CITY—HICKORY—none other THAN HI.

✡ ✡ ✡ ✡

■ *An interesting GASTRONOMICAL TALE came from RICHARD M. POTTER, who will shortly take over as FORESTER for the INTERSTATE TELEGRAPH AND TELEPHONE CO., at BISHOP, CALIF.*

Years ago the local PAIUTE INDIANS, not having ANY "SHMOOS" AROUND, had to RUSTLE THEIR CHOW by divers means. The larvae of a CERTAIN INSECT, called locally, "PAYAGIES," about THUMB SIZE, would pupate in THE GROUND. The injuns finding an INFESTED TREE, at the time OF THE DESCENT, would BUILD A FIRE around the base of the tree, the larvae, SILLY KIDS, would CRAWL INTO THE FIRE and roast to a DELICIOUS BROWN. That's ALL ON THE H.C.L. today kiddies.

✡ ✡ ✡ ✡

■ RAY HENSTOCK, SUPT. OF PARKS, of DEARBORN, MICH., kinda DRAINED the city hall of "GOLD BRAID" by bringing to the conference MAYOR ORVILL HUBBARD and four (count 'em) COUNCILMEN. Interest like that bespeaks GOOD PUBLIC OFFICIALS who realize that SHADE TREES MAKE any CITY OR TOWN.

✡ ✡ ✡ ✡

■ *In case YOU WERE BEWILDERED by the cut of the LOMBARD GOVERNOR chain in the LAST ISSUE—it was UPSIDE DOWN. Don't stand ON YOUR HEAD to get a GOOD GANDER at it, just UP END good old TREES mag.*

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■ JACK ROBINSON all done up in his "SUPERMAN FLYING HARNESS" was in rare form AT MILWAUKEE—and ably ABETTED by his co-conspirator JIM SHAFER. Needless TO SAY one sells HARDIE SPRAYERS, and the other B. G. PRATT SPRAYS. Just like that old UNDERTAKER-DOCTOR racket.

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■ *The usual SEMI-ANNUAL LETTER from LEON MILLER, ANGOL, CHILE, brings word that "THE BED OF HYACINTHS is GAY WITH HARBINGERS OF SPRING." Writ in August, and WHAT'S THE HARBINGER doing here?—DROPPING LEAVES AND TEMPERATURES all over the JOINT. LEON also says that PRUNUS MOSERI is doing NICELY on a number of ANGOL STREETS where a SMALL TREE is needed.*

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■ THE COVER PICTURE, this issue comes from an English arborist JAMES H. CAREY, THE CHILTERN TREE SURGEONS, LONDON, ENGLAND. The "ARBOREAL" TRIUME as MR. CAREY titles the CONFLICT, shows an ENGLISH YEW disputing the right to a CERTAIN BIT OF REAL ESTATE, with two ASH TREES. The group is about 70 years old, and all IN EXCELLENT CONDITION.

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■ *LARRY WACHTEL, GRIGGS WARING, HOWARD MUELLNER and OTHERS on the MILWAUKEE N.S.T.C. LOCAL COMMITTEE lived up to PAST TRADITIONS and turned out a SWELL JOB. One GRATIFYING THING about it, IN THIS ORGANIZATION, it's NOT THANKLESS, everyone APPRECIATES the EFFORT EXPENDED in THEIR BEHALF.*

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■ A lot of FAMILIAR FACES were MISSING at MILWAUKEE—MIKE HARTNEY (now, there's a face for you) KARL AMALIA (he was infanticipating—Congrats Mama), ED CONNELL (who started this), BOB WEAKLEY (probably too busy with roll call), ALEX McRAE (got caught between a couple Lonesome Pines in Caroline), ERNIE ROBERTSON (too busy snagging subs for TREES), FRANK KARPICK (couldn't shuffle off from Buffalo) and others TOO HUMOROUS to mention.

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■ *A tree that SEEMS WORTHY of a REAL TEST is the TRIDENT OR CHINESE MAPLE (Acer buergerianum). It is a SMALL TREE with NICE FOLIAGE.*

✡ ✡ ✡ ✡

■ GLENN P. BURNS, 1007 So. 74th St., MILWAUKEE, WIS., had an interesting DISPLAY OF PICTURES at the N.S.T.C. GLEN specializes in "FREAK AND UNUSUAL trees. He has PUBLISHED A SMALL BOOK of such subjects. As A REWARD to anyone SENDING HIM a "freak" pic he will send a COPY OF THE BOOK.

✡ ✡ ✡ ✡

■ *JOHN J. CONERY who has opened a new ARBORIST SUPPLY JOINT in ROCKFORD, ILL., displayed some MIGHTY USEFUL LOOKING gadgets. The leather covered PRUNING PAINT CAN; the cavity treatment and tool sterilizing PILL TUBE—write him about the specials—the LAG SCREW DRIVER, (a job that's always a pain) and the SCREW ROD DRIVER, for all sizes. VERY GOOD.*

✡ ✡ ✡ ✡

■ FIVE SUBS have just been RACKED UP for FORESTERS AND ARBORISTS in SWEDEN. NELS JOHNSON, EVANSTON, ILL., arborist, who RECENTLY RETURNED from an EXTENSIVE TRIP there THOUGHT THEY should be READING TREES Mag and made the NICE GESTURE.

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■ *ANOTHER SUB came the other day FROM INDIA—we're GETTING quite a FOREIGN AUDIENCE—wonder how LIN PRYOR is getting on, IN AUSTRALIA, with that STORY WE'RE WAITING FOR. It will be A DANDY.*

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■ WE'VE GOT TO HAVE more material for the "ARBORISTS CLINIC"—pictures of TOOLS, TRUCKS, SPECIAL GADGETS—stories on trees—QUESTIONS ON SPECIAL TROUBLES AND PROBLEMS—let's build THIS SECTION up FOR THE GOOD OF ALL. Make it a REAL "CLINIC."

✡ ✡ ✡ ✡

■ *I like MAYOR FRANK ZIEDLER'S words, opening the N.S.T.C. IN MILWAUKEE—"Trees are as important as human life to a city; they are needed to compensate for massed buildings; they are necessary to maintain the balance of life." BEAUTIFULLY SAID.*

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The Editors of TREES invite discussions, comments and all types of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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Sept.-Oct., 1948 **Journal of the National Arborist Association** Vol. 8 No. 6

EDWARD H. SCANLON, Editor
Box 5607, Cleveland, Ohio
Phone ORchard 0341

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Out on a Limb

SHADE TREE CONFERENCE IN AUGUST—

It is only natural that there would be questions asked regarding the feasibility of holding the National Shade Tree Conference in the third week of August, after the Cleveland and Milwaukee heat waves.

Many are of the opinion that the conference should not tempt the fates on a period when any gambler would give you at least three to one odds that the thermometer will go anywhere but down at that time. This has been true, not only on the last two occaasions, but probably at all conferences. In fact, the only meeting of more or less recent history, that was held in pleasant weather, was the 1942 Washington, D. C. affair—of all places.

In discussing the possibility of a later date, say the third week in September, with various people, Charles F. Irish brought out that the matter was discussed at length during the first years by the founding fathers. They decided that because many of that era had young children who would be in school during September, or later, to make it possible for the ladies to attend. This had made for a very pleasant social aspect of the organization and has resulted in much harmony between previously warring rival arborists.

Dr. L. C. Chadwick, Secretary of the conference conducted a poll in the past year and the majority favored retention of the present schedule. This would seem to clinch the argument. However, it does seem like an odd decision because of the rush of business usually on the arborists' agenda for August and we wonder if the vote was indicative of the whole opinion, or if it was a typically American vote in which the minority rules by exercising their franchise.

We also have the example of the American Institute of Park Executives who generally hold their meeting in September, or as this year, in October, without seemingly any loss of interest or attendance, and a fine representation of ladies.

We welcome further discussion in the face of the fact that reason does not seem to be serving the best interests of comfort and business.

Norm Armstrong, N. S. T. C. President

And a goodly crowd was there, 541 to be exact—so Milwaukee takes its place among the few cities that have attracted over 500 to a National Shade Tree Conference. The meeting was the 24th held August 23-27 at the Schroeder.

The following officers were elected: President, Norman Armstrong, arborist, White Plains, N. Y.; vice-president, Ray R. Hirt, head of the department of forest botany and pathology, New York State College of Forestry, Syracuse, N. Y. L. C. Chadwick, department of horticulture, Ohio State University, Columbus, continues as secretary-treasurer of the conference, and Paul E. Tilford, executive secretary of the National Arborist Association, Wooster, O., remains as editor.

Tree Care Talks

In discussing "Fungi in Relation to Cavity Development and Tree Surgery," Dr. E. S. McDonough, of the department of botany, Marquette University, Milwaukee, stated that fungi, like every other living organism, must have food for existence. Fungi vary in nutritional requirements, which may be of great importance in developing methods of controlling those that produce decay in shade trees.

Stanley C. Foll, technical director of Holton & Hunkel Co., Milwaukee, spoke on "Soils and Fertilizer Relationships to Tree Development." Using a large chart to illustrate his talk, Mr. Foll pointed out the close relationship that exists between soil acidity and the availability to plants of nitrogen, phosphorous, potassium and other necessary elements contained within the soil. Most trees grow best when the reaction of the soil ranges between pH 5.7 and 7.0 By increasing either the acidity or the alkalinity of the soil, tree growth may result.

Arborists' Problems

The program for Tuesday afternoon, August 24, was sponsored and conducted by the National Arborist Association, with Karl Kuemmerling, president of the N. A. A., presiding. Four papers were presented at this session.

Norman Armstrong, Arborist, White Plains, N. Y., recently elected president of the National Shade Tree Conference.

Dr. Stewart Scrimshaw, of the college of business administration, Marquette University, discussed "Problems of Personnel Maintenance." Advising that "men do not live by bread alone," Dr. Scrimshaw stated that dignity in the job is more desired than high wages by most men. He suggested that to maintain the best of personal relations with his men, an employer should, in certain cases, make adjustments to adapt the work to the ability of the employee, make provision for retirement of employees and, above all, treat his men with dignity and equality.

In speaking on the subject, "Common Errors in Tree Pruning," H. M. Van Wormer, Van Wormer Tree Service Co., Richmond, Va., said that an error need not represent total loss; it can be utilized as a basis for instruction of employees and made to serve as a guide toward greater efficiency. Each mistake should be reported promptly to the proper authority and fully discussed as to cause, how it might have been prevented, measures that may be taken to prevent repetition of the error in the future, effects on the tree, the owner and the tree company.

"Importance of Research in Shade Tree Care" was ably discussed by Dr. Rush P. Marshall, director of the Bartlett Tree Research Laboratories, Stamford, Conn. Research scientists engaged in public and private work and practicing arborists have in the past contributed to the general fund of knowledge concerning trees and their care.

(Continued on Page 18)

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Trees...

The Rise and Fall of Sap

By August P. Beilmann

Manager, The Arboretum,
Missouri Botanical Garden,
Gray Summit, Missouri

Man has been concerned with the amount of moisture in trees ever since he emerged from a cave to construct a log habitation. The word sap is from the old Anglo-Saxon "saep" which, the dictionary says, is "a liquid or humor essential to health." But long before these people coined a word for it, the Elder Pliny began ruminating about the growth of plants. In the eighteen centuries that have past, the problem has been solved several times only to have later discoveries invalidate the earlier solutions. A great deal of information is available today, but it is scattered throughout the literature. The one outstanding feature immediately apparent to the reviewer is that the ascent of sap was much more easily explained in Forsyth's time than it is today. Unfortunately, most people want an explanation that is understandable in terms of every day activities. They want a simple engineering or mechanical formula which pumps up the sap and another which lets it run back. These people forget—and arboriculturists are among them—that gas engines and trees have little in common.

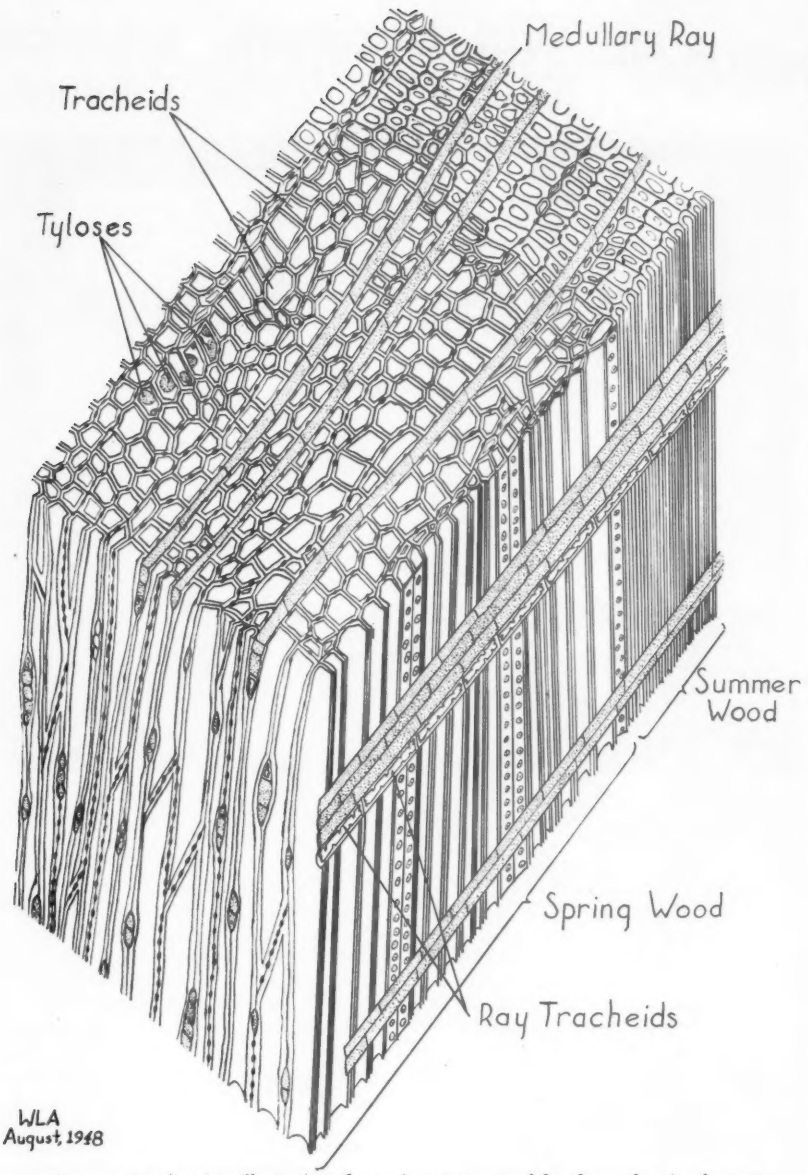
Of the many theories which have explained sap movements, only a few have stood the test of time, and even these have been variously modified in the light of newer research. Let it be clearly understood, first of all, that it is difficult to demonstrate either the rise or the fall of sap. There is no good yardstick which one can use. None the less, the bleeding of pruning cuts in the spring, the tapping of Sugar Maples, the loggers felling timber in the cold months are all practical demonstrations of the moisture changes that occur within tree trunks. Even though we cannot demonstrate, nor take a gauge reading of this phenomena, men have always recognized that the season, the growth, and the moisture are closely associated.

It was not until late in the nineteenth century that physiologists had a clear picture of the cells which are the unit structure of all plants. Robert Hook illustrated cork cells in 1665, but it was not until 1838 that Schleiden and Shwan, working in different fields, established the theory that the elementary parts of all tissue are based upon the formation of cells. But a number of years were to pass before the role of the internal structure of cells and their functions had any significance. Eventually, the early workers were able to see, to study, and to draw many of the cells which go to make up the living plant. One characteristic of all living cells was the presence of a nucleus. Cells containing this type of internal mechanism are always thought of as living cells, although such cells have been found deeply imbedded in the heart of a Redwood. When laboratory techniques and microscopes had been developed to the point where the nucleus was easily seen, then the cell walls and the various pit membranes were studied and much speculation was done concerning their function. Just how water moved about in the plant occupied the early botanists for a long time. In 1727, Steven Hale showed that the leaves of a plant would not wilt if the bark only was removed, but that a test specimen, the wood of which had been severed, wilted quite rapidly. It was obvious that water moved rather rapidly out through the leaves, and that to prevent wilting, the rate of replacement must be equally rapid. Interest then centered on the kinds of cells within the stem of a plant and their functions. Some of the early physiologists were sure that the cavities within these cells carried the water, although Unger and Sachs contended that most of the water moved in the lignified portion of the cell wall. A great many noted physiologists published articles during this interesting time: Elfing, Scheit, Errera, Haberlandt, von Hohnoel, R. Hartig, Schweindener, Strausberger. Out of all this work, a few facts emerged which are acceptable today.

The trunk of a tree is composed of a number of easily recognized structures. The woody part is made up largely of large and small tracheids, usually in alternate bands known as spring and summer wood, which together make the annual ring. The tracheids are assumed to be concerned with water conduction and are found filled with water in early spring and containing some air bubbles in late summer. All tracheids in the trunk assist in the conduction of water except those which are plugged with gums. This plugging usually precedes the conversion of that annual ring into heartwood. When enough of these cells have been closed by gums and resins, those parts of the tree serve only as storage organs. It must be remembered that such plugging or formation of tyloses is the chief difference between heartwood and sapwood. The outer layers of sapwood are an active sheath about the tree and terminate in the tracheids produced in the current year. These extend clear to the terminal bud. In the trunk itself and often extending from the pith to the periphery of the woody cylinder (as in the case of Oak); there is another series of cells called "wood rays" or "medullary rays" which run at right angles to the longitudinal tracheids. These are connected by pits to those cells which they touch. The wood rays would appear to be directly concerned with the lateral diffusion of water and solutes. They also appear to serve as storage organs and they have been known to contain living protoplasm even though deeply imbedded in a tree. To the arborist, they are extremely important because they are the seat of the awakening and growing cambium in spring. Outside the woody cylinder of the trunk, we find the phloem, and the cork. The undifferentiated and mucilaginous layer between the wood and the phloem is the cambium.

How It Works

All along we have been satisfied with the explanation that higher temperatures, sunshine and rain in spring activates the growing tips. This explanation is all right until one experiences an extremely dry midwestern spring. After observing trees opening their buds in a normal manner in a season when the ground contains less moisture in April than it did in December—then, that explanation of the rise of sap becomes complicated. Obviously, there must be some controlling agency, or we would find trees in active growth whenever the temperature and the moisture were favorable; this might even occur in winter. Some very interesting work by Drs. E. J. Lund and H. F. Rosene, shed a great deal of light upon the factors which control the initiation of growth. In their recent book, *Bioelectric Fields and Growth,* they were able to measure microscopic amounts of current generated in specific parts of certain growing cells. They found that the upper segment of a root tip was an electric field, and that they could distort or redirect the growth by applying a current to these cells. They found that one function of the electric field present in the growing tips of the plants they studied was to act as a directive force in laying down new cells. It would also effect the orderly transfer of various materials in morphogenesis



A composite drawing illustrating the various terms used by the author in the text.

and the transport of free ions. They found that so long as a dynamic electric field exists, there is movement and shuffling of materials, and they suggest that electric potential differences are perhaps responsible for the movement of hormones. In this work, we now have an insight into the mechanism which initiates growth. The awakening in spring seems to be a function of certain hormones. It is not known if such electric fields occur everywhere in the plant, but it is a sound explanation for the almost instantaneous awakening of the cambium. The term "instantaneous" will be used in this connection a number of times. The author has shown (in a paper before the National Shade Tree Conference) that measurable changes occur throughout a tree within five minutes after the initiation of an environmental stimulus. Generally, after awakening, osmosis is given credit for most water conduction. Osmosis is nothing more than diffusion through a pitted membrane. This is exactly what the crosswalls of a tracheid appear to be. It has also been shown that osmosis can pump water against a steep gradient. This means that cells containing low concentration of solutes may still be able to absorb more water resulting in greater dilution. Obviously, a method of moving sap through a tree which depends on osmosis exclusively could not react as swiftly as the author has indicated. There are millions of crosswalls in the tracheids connecting the roots and the terminal bud of a mature tree. It seems equally unlikely that the demonstrated diffusion through a membrane should suddenly become diffusion against a pressure gradient, without some unknown factor in operation. The work of Lund and Rosene may rescue osmosis from oblivion as one of several water conducting mechanisms in tree trunks.

Assuming that the tree has put forth its first leaves, it now requires additional water. Some botanists have estimated that large trees will use about two tons of water in a month. This figure may be satisfactory for a tree growing in a tropical rain forest, but there are many summers in the Midwest where no tree has access to two tons of water for a whole season. Suppose now, an arborist fertilized such a tree. If he uses a method which evenly distributes the fertilizer throughout the root area, he should set up an exosmosis. This means a withdrawal of water from the tree. On occasion, this can and does happen. It has been demonstrated, however, that except in cases where foliage was burned, a fertilized tree is capable of making normal growth without the addition of much water. In fact, fertilized trees in the Middle West show much less injury in dry years than those which have not been fed. From this, it appears that osmosis cannot be the sole conducting mechanism.

Root pressures have been measured. They have been shown to be of such magnitudes that, theoretically, they force water through the tallest tree. Laboratory techniques for demonstrating root pressure usually consists in attaching a manometer to a root which has been severed from the stem. Pressure reading, so obtained, are then translated by engineering formula and are shown to be great enough to move water several hundred feet. The chief objection to this as a means of moving sap is that the "friction loss" in conduits .01 m.m. is greater than any conceivable gauge pressure which might be developed. So root pressures are only of limited if any importance in sap movements. MacDougal was unable to demonstrate root pressure on a small Pine.

There remains, then, one more theory which approaches a real explanation for the movement of sap. This was the Cohesive Tension Theory proposed by Dixon about 1916. He maintained that there are continuous strands of water from the roots to the uppermost branches, and that evaporation from the leaves exterted a pull on these individual strands. These microscopic columns or strands flowing through the tracheids have tremendous tensile strength, and

(Continued on Page 20)

Dawn Redwood—Most Fascinating Botanical Discovery of the Century

By H. H. HU

Director, Fan Memorial Institute of Biology, Peiping, China

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China has the richest temperate flora in the world. Since the mesozoic age a large portion of China has never been submerged by the transgressing sea; and during the glacial period, glaciation has been little developed in China; again there have been in China no insurmountable barriers, such as a large body of water like the Mediterranean sea or a great desert like the Sahara, which prevent plant migration back and forth during the glacial and interglacial periods.

All these factors contribute to the origin and survival in China of numerous interesting flowering plants, both gymnosperms and angiosperms, especially in the southwestern and upper Yangtze provinces, such as western Hupeh, Szechuan, Yunnan, Kweichow, Kwangsi and Kwangtung provinces. Among the interesting Chinese genera of trees, *Ginkgo* was the most famous and was first rightly called the "living fossil." But there are many other "living fossils" among Chinese trees, such as *Pseudolarix, Keteleeria, Amentotaxus, Glyptostrobus, Cunninghamia, Cephalotaxus,* and *Libocedrus,* among the gymnosperms and *Cericidiphyllum, Liriodendron, Petrophiloides* (*Platycarya*), *Sassafras, Nyssa,* and many others among the angiosperms, which have been discovered in fossil conditions in Europe or North America from very ancient geological times. Other genera of Chinese trees, such as *Taiwania* and *Fokienia* among the gymno sperms and *Rhoiptelea, Eucommia, Tetracentron, Euptelea, Trochodendron,* etc., among the angiosperms, may be discovered some day in fossil conditions also. Only the most striking relics are called "living fossils." Among these the latest and the most interesting is the *Metasequoia* discovered in 1941 in Wan Hsien of Szechuan province.

In the winter of 1941 Professor T. Kan of the Department of Forestry of the National Central University journeyed from Hupeh to Szechuan, and saw on the roadside at Mou-tao-chi in Wan Hsien a large deciduous tree which was called by the natives SHUI-SA or water fir. This attracted the attention of Professor Kan. Unfortunately no specimens were collected at that time as all the leaves had fallen off. Next year Professor Kan requested Mr. Lung-hsin Yang, the principal of the Agricultural High School, to collect herbarium specimens for him. But these were not identified. In the summer of 1944 Mr. T. Wang, a staff member of the Central Bureau of Forest Research, went to western Hupeh to explore the forests at Shen-lung-chia, and was asked by Mr. Lung-Hsin Yang to go to western Hupeh by way of Wan Hsien and Enshi in order to investigate the SHUI-SA at Mou-tao-chi.

THE DAWN REDWOODS
EXHIBIT
COURTESY DIVISION OF
SHADE TREES
CITY OF CLEVELAND
Science Makes a Spectacular Discovery
PREHISTORIC REDWOOD SEEDLINGS
(Metasequoia glyptostroboides Hu and Cheng)
GROWN by the DIVISION of SHADE TREES from
Seed collected on the original expedition of
discovery in 1947 in Szechuan-Hupeh
province of CHINA

Dawn Redwood seedlings grown by the Cleveland Division of Shade Trees from seed distributed by the Arnold Arboretum. This exhibit was prepared for the recent Business Men's Garden Show in Cleveland.

At Mou-tao-chi Mr. Wang collected herbarium specimens of leafy branches and fruits of this tree and thought it to be *Glyptostrobus pensilis* Koch, or SHUI-SUNG, the water pine, which is a common deciduous coniferous tree in Kwangtung province found also in Kiangsi. Mr. Chung-lung Wu, an assistant in the department of forestry of the National Central University, met Mr. Wang, who gave him a branchlet of the water fir with two cones. Mr. Wu presented these to Professor W. C. Cheng of the same department, who considered this tree not a *Glyptostrobus* but a new genus, on account of the opposite character of the peltate fruiting scales, which differ from those of *Glyptostrobus,* although the deciduous linear leaves are somewhat similar.

Professor Cheng then sent his assistant, Mr. C. Y. Hsieh, to go twice to Mou-tao-chi in February and May 1946 and these trips resulted in the collection of specimens of flowers and young fruits of this water fir, from which Professor Cheng understood the morphology of this tree more clearly. In the autumn of the same year Professor Cheng sent to me fragments of herbarium specimens Mr. Hsieh collected and asked my opinion about this new genus, which he thought to be closely allied to the American genera *Sequoia* and *Sequoiadendron,* the California coastal redwood and the famous big tree.

It happened that I had a reprint of a paper by a Japanese paleobotanist, Mr. S. Miki, instructor in Kyoto University, entitled "On the Change of Flora in Eastern Asia since Tertiary Period," in which he proposed the new generic name *Metasequoia,* based on two fossil species which were formerly known as *Sequoia disticha Heer* and *Sequoia japonica* Endo, both found from the pliocene beds near Tokyo. He found his new genus *Metasequoia* differing from the true *Sequoia* in the long stalk and in the opposite scales of the fruits. I had on hand also a paper by another Japanese paleobotanist, Professor S. Endo, entitled "A New Palaeogene Species of

(Continued on Page 16)

Connecticut Defies Nation's Tree Men

Connecticut challenges the tree experts of the country. It has just crowned its first State champion tree climber and rope thrower. And it will match these champs against the best any state or section of the nation can offer.

Tree climbing champion is Martin Olszewski, 31, of Greenwich. The ace rope thrower among the state's tree men is A. E. Myder, also of Greenwich.

They were chosen July 14 as a feature of the annual summer meeting of the Connecticut Tree Protective Association, held at the Bartlett Tree Research Laboratories grounds at Stamford.

It was the first contest of its kind ever staged. And take the word of the 250 members of the Association and guests who were present, their guests, the 40 contestants, their cheering sections and the press and photographers who covered the event—it was something to behold.

It was a spirited sports event. Rivals cheered each other's accomplishments. The audience gaped open-mouthed. When one contestant missed a rope throw by a hair's breadth, everyone moaned in sympathy at the ill fortune. When a tree climber did his trick—shinnying up a tree with the use of his rope, reaching and touching three designated rubber balls placed at branch tips 40 feet apart and returned to the ground with skill and speed—he was cheered as heartily as any Olympic champion.

From 9 a .m. until the afternoon shadows grew long, the contestants kept climbing trees at intervals. During the morning the preliminaries were held. In the afternoon the finalists met.

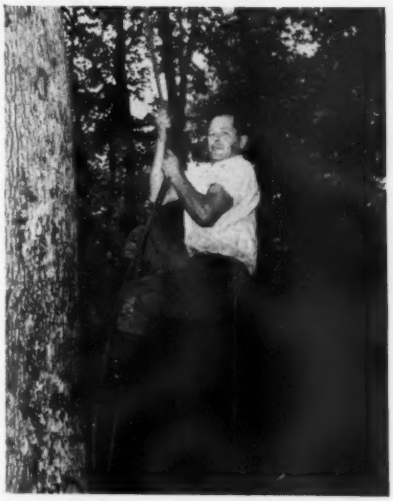
The muscled young men who are more at home in trees with a strong rope and safety knot had their day. And what a day it was! Photographers who had covered every type of sports meet in their life, and a lot of exciting murder stories and disasters, confessed that the show these tree men put on was simply incredible.

The rules were simple. The contest was judged by the elapsed time between leaving the ground, reaching the designated objectives and returning to the ground. Only regulation climbing rope was used; no ladders were permitted. Each contestant used the same tree. Everything was equal. Everyone had to play it safe, observing all the rules of safety a tree man does every day in his work.

J. M. Fennell, president of the Connecticut Association, had appointed Joseph A. Dietrich, superintendent of the division of parks and trees at Greenwich, to run the contests. He chose as his judges Prof. Sherman H. Hollister, professor emeritus of horticulture at the University of Connecticut; Joseph Negyesi, Stamford tree warden, and John Stashenko, Stamford tree expert.

Stop clocks were used. Champion Olszewski set the record time of 3 minutes 24.5 seconds for the climb. Martin Learned of East Portchester

(Continued on Page 24)



Top picture—Champion tree climber of Connecticut, Martin Olszewski of Greenwich. Lower left—Connecticut's champion rope thrower, A. E. Myder, also of Greenwich. Large picture above—The champs and runners-up received trophies from Mr. George Barrett, Selectman of the town of Stamford. Left to right—A. E. Myder, champion rope thrower; Mr. Barrett; Martin Olszewski, champion tree climber; Martin Learned, second place in tree climbing; Anthony Presto, third in tree climbing; Ronald Mandeville, second place in the rope throwing contest; and John Calitri, third place winner in rope throwing.

The Arborists Clinic

QUESTION: We are interested in truck mounted extension ladders for use in tree trimming, especially for line clearance work. We understand that they are being used in Southern California but have been unable to obtain information as to their success or by whom they are manufactured. We would appreciate any information you can give us.

Very truly yours,
J. W. Stone,
California Forestry Co.,
Berkeley, Calif.

ANSWER: One of the best truck mounted extension ladders for use in line clearance that I know of is the rig manufactured by the American Coach & Body Works of Cleveland, Ohio. This is a ladder type and one was on display at the National Shade Tree Conference in Milwaukee.

I hope this information will be of some value to you and in the meantime, I shall try to obtain information on other types for you.

Editor.

* * * *

QUESTION: We have many problems! The newest is the appearance of what I assume to be a slime flux on two elm trees. These trees were peeled by youngsters, but the wound has entirely healed over except for a thin line down the center. Aphids apparently damaged some of the cambium, but on two spots the scar is "leaking." What to do? The tree is healthy, and except for this discharge, we thought the healing had been satisfactory. Would like advice.

Beatrice Horneman,
Landscape Architect,
Chicago Housing Authority, Ill.

ANSWER: Slime flux has long been an irritating malady of American Elms, and has never been entirely overcome. An excellent outline for treatment is recorded by Dr. E. F. Guba, TREES Magazine Vol. 5, No. 2, 1942, and by Dr. P. P. Pirone in his "Maintenance of Shade and Ornamental Trees."

Most recent development in this disorder is the work Mr. Charles F. Irish has been doing for the past three years by chemotherapy with certain sulfa drugs. Mr. Irish is preparing a paper for publication in TREES Magazine on his observation.

Editor.

Special Gasoline Notice

The present practice among most gasoline manufacturers of adding a relatively large amount of "ethyl" to the so-called common gasoline has made it necessary for us to revise our directions as to the use of gasoline in your Lindsay compressors units.

"Fill fuel tank with gasoline such as Blue Sunoco or White Amoco, which contain no "ethyl." If gasoline WITHOUT "ethyl" is not available, use High Test gasoline of any major oil company."

We would recommend that you follow these directions very carefully in order to avoid unnecessary regrinding of the valves of your engine.

In order to clarify these directions, may we point out that prior to the war it was understood that common gas either contained little or no "ethyl" and high test, on the other hand, contained an appreciable amount. However, owing to the present method of cracking gasoline, the lower grades, or the so-called common gasoline, now in most cases contain more lead or "ethyl" than the high test.

TO REPEAT, EVEN THOUGH THE HIGH TEST GASOLINE NOW AVAILABLE IS PREFERABLE TO THE REGULAR FOR USE IN AN AIR COOLED ENGINE, WE STRONGLY RECOMMEND ONE OF THE SPECIAL BRANDS OF GASOLINE CONTAINING NO "ETHYL."

The Arent Tree Mover

The ARENT TREE MOVER is one of the handiest pieces of equipment a Tree man can own. It can lift a boxed or balled and burlapped tree weighing up to 3/4 ton out of a hole, transport it to a new location, and gently lower it into a hole prepared for it. The ARENT TREE MOVER can raise a small tree of 1000 pounds or less to a height of four feet above ground.

The slow tedious operation of rolling a boxed tree up an incline, or "rocking" a balled specimen back and forth to raise it out of a hole is entirely eliminated.

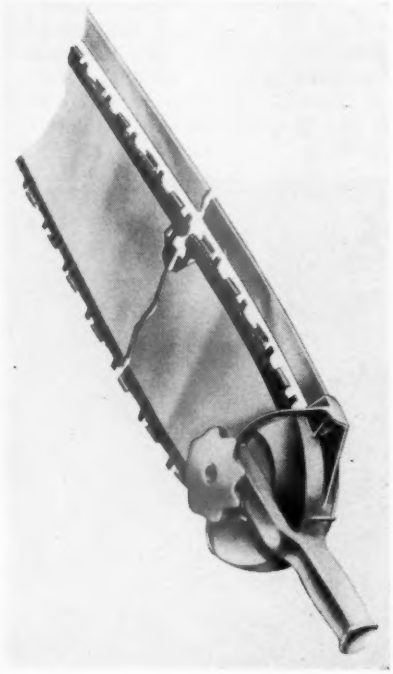
Two men can easily operate the ARENT TREE MOVER which is equipped with a ratchet winch and chain-and-leather sling. There is no cracking or breaking of the earth ball which encases the roots of the tree.

When transporting a tree from one location to another, the ARENT TREE MOVER becomes a trailer, equipped with pneumatic tires and having a tongue at either end to facilitate ease of operation.

The ARENT TREE MOVER is manufactured by the American Trailer Company of Los Angeles. It weighs approximately 400 pounds, and is priced at $375.00 F. O. B. Los Angeles, Calfornia.

McCulloch Features New Saw Teeth

The Rip-Cross chain, developed by McCulloch Motors, has proved to be a great contribution to the science of woodcutting. This chain cuts with a router action and is fully efficient in ripping and cross-cutting any type of wood or root. In addition, because of the rounded, chisel edge on each tooth, no critical wear points exist. Sharpening is therefore relatively infrequent. However, when required, sharpening is a simple process. No special skill is necessary, the only tool required is a round file, and the chain can be sharpened without removal from the blade. Because of the design of the chain, no setting is ever needed.



Rare Tree Butchered For Wires

By EDWARD H. SCANLON

Several years while on a trip to some Painesville, Ohio, nurseries the writer was pleased to "discover" one of the most unusual upright forms of red maple it was ever his pleasure to see. This tree standing at the top of a six-foot bank on Bowhall Road was a lovely towering pyramidal type with short, strong, slightly ascending lateral branches. It was about 35 feet tall with a spread of nearly 15 feet and a trunk diameter of 16 inches.

Here was a perfect specimen for propagation as a street tree. Inquiry failed to disclose the owner of the property. However Charlie Irish had known of it for many years and said that at one time the property had belonged to the old Storrs & Harrison Nursery. This summer the writer decided to perpetuate this beautiful form by budding. But, arriving on the scene, John Michalko and the writer found they were too late. A line clearance crew had ruthlessly butchered this priceless clone to permit passage of light wires. This is the kind of stupidity that results either from a disregard for plant life of any character or ignorance of the species or varieties encountered.

At one time someone had recognized the value of this rarity to the extent that they had forced the wire owners to side-arm the poles as can be seen in the upper right picture. Unfortunately this regard was not carried far enough to have perpetuated the form.

But it is not lost, by rare good fortune the brush of this "murdered" tree was still green and several buds have taken. The new "Bowhall" red maples will not be set where a thing of beauty will have to be ruthlessly slaughtered for a thing of ugliness by people calling themselves "tree experts."

The Spoiler

With apologies to the author of "Trees."

I think that I shall never see
A man so asinine as he
Who leaves his camp fire ere it's out,
And throws his burning butts about;
A man who lives for just today,
And burns the forests, come what may;
A man who hunts 'tween dusk and dawn,
And catches fish that went to spawn;
Who kills a deer for killing's sake,
And leaves it for the wolves to take;
Who overtraps a beaver house,
And in closed season shoots ruffed grouse;
A man who goes his selfish way,
And cares not who must sometime pay
For all the devastation wrought
By him, who never had a thought
For those whose heritage he'll spoil,
To whom he'll leave just rock and soil.

Upper left—The Bowhall Maple before its unnecessary demise. Upper right—John Michalko standing disconsolately on the stump of the Bowhall Maple. Note side-arm pole done previously to clear this beautiful tree. Lower picture—The stump is all that remains of this once rare upright Red Maple form.

The Mechanics of Mist Spraying

By George E. Tirrell,
Greenfield Sprayer Co.,
Greenfield, Mass.

Mist spraying, as many people seem to believe, is not a new invention. As long ago as 1924, nearly every basic mechanical device for mist spray application was being presented to the U. S. patent office. Since then a great many inventors and scientists have contributed to the development of mist spray.

The use of D. D. T. as an insecticide during World War II was probably the real reason for the seemingly sudden development of the mist sprayer. D. D. T. was found to be so toxic, to many destructive and annoying insects, that it could be used in a highly concentrated spray mixture and applied in the form of a fine mist or fog with excellent results in controlling the gypsy moth, house fly, mosquito, etc.

The economy experienced by this method of spraying was immediately appreciated by the commercial arborist, city forester, public health official, and others who suddenly realized that it would no longer be necessary to haul heavy loads of liquid and drag about the long lengths of hose required by the old hydraulic method.

The mechanical device for applying mist spray was also lighter in weight and the reduction of time loss from repairing hose couplings, packing pumps, etc., was reduced to a minimum.

The enthusiasm emanating from this decidedly interested group helped to expedite mist spray from its hitherto dormant stage to its present status.

It does not take a great deal of imagination to visualize the prospects of the future of mist spraying.

In this United States of America, noted for its mechanical and scientific genius and its ability to compound chemicals for any emergency, the future for mist spray looks bright indeed.

In the past five years the mechanics and the chemists have teamed up to give proof that a new era of pest control is well in the making.

The mechanical development for dependable machines and the chemical development for better spray materials giving a wider range of control has been rapid. Almost too rapid, in fact, with a resulting confusion in the minds of many who because of this rapid growth of a new device are almost entirely without knowledge of the fundamentals pertaining to mist spray, either mechanical or chemical.

This article is being written in the hope that it may benefit to some degree those interested in the mechanics of mist spraying.

The mist sprayer is a device of comparatively simple construction, consisting of a fan, a blower or a rotary compressor to force air at high velocity through an opening. Into this air stream is injected by means of a pump, a super charger or auxiliary fan, by gravity or suction the concentrated spray material to be applied. Power to drive the air generator is supplied either by a gasoline engine or an electric motor, depending upon the size of the machine or its portability.

The design of the machine depends entirely upon the inventor's viewpoint regarding the proper method of generating air, introducing the spray material into the air stream and the directioning control of the air stream.

The merits of different makes of mist sprayers will, as always, be left to the judgement of the purchaser as being the one best suited to his particular job. Therefore, it is of importance that a prospective user or purchaser should knew as much as possible the qualifications necessary in any mist sprayer to have it be a satisfactory machine for that job.

Many of the early mist sprayers were rather cumbersome and more difficult to operate than the present machines and not as much was known about the control of the air stream. As these deficiencies have been recognized, machines have become lighter in weight, easier to operate, and more economical through increased efficiency.

The air stream is, of course, the most important factor in a satisfactory mist sprayer and because of its invisible quality is probably the most baffling to the public in general. In attempting to clarify some of this mystery, it is well to remember that air is compressible.

For example: Ten cubic feet of free air enclosed can be compressed into one, two, or three cubic feet and so on. Therefore, it is easy to understand that the carrying power of a mist sprayer air stream depends upon how the air is compressed at the nozzle outlet or the volume of free air that is being thrown by an unenclosed fan. Again for example: A mist sprayer discharging 8000 cubic feet of air at 150 miles per hour velocity would in fact be displacing many times that amount of free or non-compressed air. This explanation should make it more clear how such a seemingly small amount of air can attain such distance or spread.

The control of this air stream after it leaves the container or nozzle is somewhat more complex.

As the free air is drawn into the fan through a large opening, it is in turn forced out through the nozzle, which is, in most instances, of a size much smaller than the intake. This causes the air drawn in by the fan to be compressed. The size of fan, plus the R. P. M. and the size of the nozzle outlet, govern the air velocity and cubic feet per minute of displacement. By varying the nozzle diameter or shape, air currents of different character may be obtained. As the air passes from the fan or compressor through the container, the outer circumference of the air stream is retarded by

(Continued on Page 20)

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Write for Descriptive Bulletins
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CHAIN SAWS

HERE'S THE FIRST REAL ANSWER for high-speed, economical land clearing and timber bucking or felling. The McCulloch is a husky wood-cutting wizard, with many new features to speed timber work in construction, railroad, and tree-maintenance operations.

FULL 5 HP FOR TIMBER UP TO 5 FEET ★

WEIGHS ONLY 45 LBS. COMPLETE WITH 20" BLADE AND CHAIN ★

CHOICE OF BLADES IN 20, 36, 48, AND 60 INCH LENGTHS ★

★ All-purpose Rip-Cross chain is easily sharpened by hand filing in the field. Its curved cutting teeth never need setting.

★ 360° swivel permits close felling and underbucking. In addition, the engine will operate in any position, because of its McCulloch floatless carburetor.

★ Automatic clutch stops the chain when the engine is idling. This safety feature also prevents the engine from stalling in a timberbind.

★ The handle detaches instantly, for one-man use or to permit pulling the blade through a cut.

★ Correct chain tension is automatically adjusted.

★ Many other features—*kickproof* recoil starter, stainless-steel blade and conveniently grouped engine controls—save time and effort on the job.

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20-inch chain saw...$385.00

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NAA NEWS

By PAUL E. TILFORD, *Secretary*
Box 426, Wooster, Ohio

Discussions of Industry Statistics covering rates of pay and other compensations to employees; hourly charges to clients for tree work; charges for the use of equipment, such as trucks, chain saws, etc.; charges for spraying trees; and charge for line clearance constituted a major part of the Association's August 23rd program which preceded the meetings of the 24th National Shade Tree Conference at Milwaukee. The date presented had been supplied by the members. Edward W. Higgins, Marvin DeSmidt, Gerald Corr, and Ross Farrens served as discussion leaders.

In addition to their pay, most Association members give employees certain other considerations and compensations. Either part or full travel to and from jobs is paid by most companies. Some vacation, generally two weeks with pay at a slack time during the year, paid holidays, and some bonus are granted by most N. A. A. members to regular employees who have been with their employer for a period of time, usually one year or more. The average hourly rate paid tree workers is less than that of carpenters, bricklayers, or plumbers but the tree worker gets in more hours. If pay is figured on an annual rather than hourly basis, the yearly earnings of tree workers are more nearly comparable to the pay of the tradesmen in other fields than the hourly rates indicate.

About one-half of the Association members are finding help more plentiful and of higher quality than was the case a year ago. But a shortage of trained and efficient help is still the arborist's No. 1 problem.

Oscar Warner, Waterbury, Connecticut, in speaking on "Collections," said that if a job is properly sold and the client understands what is going to be done and the basis for charging, that little trouble should be had in collecting. Usually, in case of a misunderstanding, an agreeable settlement can be reached and collection made if the matter is talked over with and explained to the client promptly. Only as a last resource is it advisable to use legal means for collecting a claim.

In speaking on "Business Ethics With Respect to Clients, Employees and Competitors," Vance Shield said that, basically ethics means right action in our dealings with others—treating the other fellow like we would want him to treat us. Ethics or right action toward our clients is of first importance because without them we would have neither employees nor competitors. Reputation and ethics are by implication synonymous—to preserve one we must observe the other. "Reputations are built by the impressions we make upon others in our various every day contacts and the exchange of those impressions between persons who for any reason may have an interest in us or in our activities."

Right action toward our client, Mr. Shield said, should embody, (1) intelligent diagnosis of his problems, (2) proper recommendations that will best serve his interests—not ours, (3) follow up of active service, and check results, (4) consideration of ability to pay and sincere endeavor to help without fee or charge if situation warrants, and (5) keeping our relationship with them on a professional basis—avoid developing a personal relationship; it is usually costly to do so.

Right action toward our employees is important since they are second only to our reputation among our assets. They merit our consideration in (1) fair remuneration, and (2) their well being and happiness (not a paternalistic attitude on our part). We should cultivate our client's confidence in our employees (associates), praise them when they merit it, respect their confidence, cultivate their interest in the success of their organization, and assure them in so far as possible permanent and secure employment.

With respect to right action toward our competitors, we should respect, outwardly at least, any adversary. We should lose to competitors with a smile, should seek some degree of association with them to improve public respect for all tree work, and we should avoid so-called secret methods and share knowledge with our competitors.

"Conduct ourselves in all contacts so that we are a part of our community and if we try we can achieve and hold the respect of our clients, employees and competitors and so know the full joy of living."

Elden A. Werner, Mgr. Personnel Department, Gulf States Utilities, Baton Rouge, La., gave an excellent talk on "Employee Relations." In discussing job analyses made by some large corporations, Mr. Werner listed the following eleven principal job features in the order of which they have been found by surveys to contribute to job satisfaction: 1. My immediate boss, 2. Personal interest the company takes in me, 3. Working conditions, 4. Interesting work, 5. Chances for advancement, 6. Security, 7. Pay, 8. People I work with, 9. Handling of complaints, 10. Vacation policy, and 11. Working hours.

A colored moving picture presented by the Carolina Tree Service, Inc., and the Dow Chemical Co., showing the work of the Carolina Tree Service, Shelby, N. C., in controlling brush growth on right-of-ways by spraying with 2, 4-D and 2, 4, 5-T attracted much interest and comment. This method certainly appears to be effective under North Carolina conditions.

Newly Elected Officers

Officers and directors for the ensuing year elected at the Association business meeting, August 25, are as follows:

President—Albert M. Meserve, Union Savings Bank Bldg., Danbury, Conn.

1st Vice-Pres.—C. L. Wachtel, 611 Maywood Ave., Wauwatosa, Wis.

2nd Vice-Pres.—Walter P. Morrow, Sewickley, Penna.

Secretary—Sidney McNeal, 347 Circular St., Tiffin, Ohio.

Treasurer—Oscar F. Warner, 24 E. Aurora St., Waterbury, Conn.

Executive Sec'y-Treas—Paul E. Tilford, Wooster, Ohio.

Directors—R. D. Lowden, 1274 Great Plain Ave., Needham, Mass. (1949); B. C. Deibel, Buechel, Ky. (1950); H. N. Engledow, R. D. 16, Box 534, Indianapolis, Ind. (1951).

Special Committees

1. Safety Practices—Karl Kuemmerling, Chm., Renkert Bldg., Canton, Ohio; Gerald Corr, Blume System Tree Experts, 2736 Virginia, Houston, Texas; Alex McRae, Carolina Tree Service, Inc., Shelby, N. C.

The purpose of this committee is to make a study of safety practices for tree workers and to prepare outlines or a manual for teaching the different steps in safety, starting from the beginning with the person who has no knowledge of tree work and progressing step by step up to the trained worker. Safety for our men is of top importance and more attention to safety with fewer accidents is the only way that our workmen's compensation insurance rates can be reduced.

2. Cost Analysis and Client Charges. —H. N. Engledow, Chm., R. D. 16, Indianapolis, Ind.; Albert W. Meserve,

(Continued on Page 26)

The "Orchardair" Mist Sprayer

A machine combining the highest efficiency rating with light weight. Order now to be assured of early spring delivery.

All steel and aluminum construction.
All moving parts fitted with grease fittings.
Weight of machine (empty) 650 pounds.
Rotation 46" circle.
Price FOB Greenfield $1450.

Now in use by City Shade Tree Depts.; Commercial Arborists; Orchardists; Fly and Mosquito control operators.

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Distributor Middle West States
MIDWEST MIST SPRAYER CO.
Westlake, Ohio

Distributor Central Atlantic States
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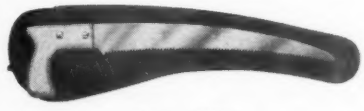
6905 York Rd. Baltimore, Md.

634 Renkert Bldg. *Karl Kuemmerling, Inc.* **Canton 2, Ohio**

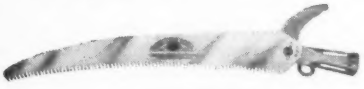
#24 SAW

4½ point, 24" long, handmade, hard beech handle, fastest cutting saw on market, heavy leather safety scabbard to fit.



#16 SAW

6 point, 16" long, fast cutting, preferred for smaller cuts. Leather scabbard with swivel snap on back.



#5 POLE SAW

16" long, 6 point needle teeth, holes for 3 positions, heavy wing nut, Seymour Smith head of aluminum alloy.

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Dawn Redwood

(Continued from Page 8)

Sequoia," in which he published a new species, *Sequoia chinensis* Endo, from eocene beds in Fushun coal mines in southern Manchuria and Kawakami coal mines in southern Saghalien. This I found to be also a species of *Metasequoia.* Thus I published a paper in the Bulletin of the Geological Society of China, Vol. 26, 1946, entitled "Notes on a Palaeogene Species of *Metasequoia* in China," in which I transferred *Sequoia chinensis* Endo to the genus *Metasequoia* and announced the discovery of a living species of this remarkable tree in Wan Hsien of Szechuan province.

I then communicated with Professor Ralph W. Chaney of the Department of Paleontology of the University of California, who had not seen either Miki's or Endo's paper. On this basis of the descriptions I supplied to him, Professor Chaney found that *Sequoia macrolepis* Heer, *S. fastigiata* Sternberg, *S. concinna* Heer, *S. Langsdorfii* Heer, *S. Nordenskioldi* Heer, *S. Reichenbachii* Heer, and *S. Herrii* Lesquereux all belonged to this new genus *Metasequoia.* He considered the discovery of this living *Metasequoia* the most interesting in botany in a century.

After Mr. Hsieh made the collection of herbarium specimens Professor Cheng sent a specimen to Dr. E. D. Merrill for examination. I wrote to Dr. Merrill telling him my identification of this new tree to the fossil genus *Metasequoia* and requested him to send $250 to enable Mr. Hsieh to go to Szechuan to collect seeds. Dr. Merrill sent the money and Mr. Hsieh flew to Chunking in the autumn of 1947 and then went to Mou-tao-chi where he collected large quantities of seeds, which Professor Cheng sent to Dr. Merrill, who distributed them to 76 institutions and persons interested in trees for propagation purposes. I also distributed these seeds to a few institutions and persons abroad, and many important institutions of botany and forestry in China have been given seeds also for propagation purposes.

Last winter Professor Chaney wrote to me expressing his wish to visit the *Metasequoia* region to make personal investigations. Early in February this year Professor Chaney flew to Nanking and with Mr. Hsieh both flew to Chunking, from where they journeyed to Mou-tao-chi and Shui-sa-pa in Lichuan Hsien of Hupen province. In these bandit-infested regions they explored for three weeks and took photographs and woodborings and collected herbarium specimens of plants associated with this tree. I met Professor Chaney in Nanking in the latter part of March. We discussed the phylogeny of *Metasequoia* and *Sequoia,* and the relationship between the families Metasequoiaceae, Taxodiaceae and Cupressaceae. At the same time we started the movement to establish a committee in the Chinese government for the conservation of *Metasequoia,* which is on the verge of extinction as there are found no more than 1,000 large and small trees of this living fossil in existence, and the peasants are still cutting the trees for interior finishing purposes. Now such a committee has been established, the ministries of interior, education and agriculture, the Academia Sinica, the National Central Museum and the Fan Memorial Institute of Biology all have representatives to participate in this work, looking forward to the establishment of a Metasequoia National Park in the type region. Professor Chaney was appointed a foreign member of this committee. Professors Merrill and Chaney have jointly made an appeal to subscribe money for this purpose.

Mr. Hwa has journeyed extensively in Szechuan and Hupeh to search for all the trees of *Metasequoia* growing in these regions. *Metasequoia* was first discovered at Mou-tao-chi of Wan Hsien in Szechuan province. There are found three trees, the largest of which is 33 meters in height and 3.3 meters in diameter at the swelling buttress and 2 meters in diameter at breast height; the other two are small trees. These are all the *Metasequoia* trees found within the boundary of Szechuan province. In Chien-nan county of Lichuan Hsien of Hupeh province Mr. Hwa discovered another tree measuring 30 meters in height, 1 meter in diameter at breast height; another in Wang-chaying measuring 35 meters in height and 2.1 meters in diameter breast high. From Ta-pan-ying through Shui-sa-pa to Shio-ho, along valleys about 40 LI long, there are large and small trees, altogether about 1,000 individuals, among which the large ones there number about 100, the tallest measuring 30 meters in height. The natives frequently dig the wild young trees or make cuttings and plant them along the rice fields or streams or before their doors. North from Wan Hsien and south down to Shui-sa-pa, the *Metasequoia* region extends to an area about 800 square kilometers, with Shui-sa-pa as the distribution center. Altitudinally *Metasequoia is distributed from* 800 *to* 1,350 meters. Within this region there is plenty of rainfall and a large amount of humidity, cool in summer and with heavy snow in winter. Its ideal site for propagation is the highlands in central and eastern and southwestern China at an altitude of about 1,000 meters.

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As Professor Chaney returned to Nanking, Mr. Hwa was left behind to make further exploration. He traveled extensively in western Hupeh. Though no further discovery of *Metasequoia* trees has been made, he discovered several large tracts of forests which have not been discovered before. He made extensive collections of herbarium specimens. Surely there will be new species of plants discovered. Latest interesting news from him is that at the border region between Lichuan and Enshi Hsiens he discovered about a dozen large trees of *Taiwania,* all about 40 meters high, a genus of coniferous trees consisting of two species, one discovered in Formosa, and the other in western Yunnan and Upper Burma. This one found in western Hupeh may present a new species or may be either of the two existing species, or may be an intermediate form which will unite these two into one species.

The discovery of a *Taiwania* in western Hupeh is interesting enough, as it represents an endemic genus of conifer in China which is at the same time the tallest and longest living conifer tree in China. *Metasequoia* is no more than 35 meters in height and about 600 years or a little more in age, while *Taiwania* attains a height of 60 meters. Mr. C. W. Wang of the Fan Memorial Institute of Biology has felled a large tree found beside the upper Salween in western Yunnan, and found it to be 1,700 years old. As *Metasequoia* has been now widely introduced in America and Europe, this new *Taiwania* should be introduced also, as it will thrive in the same territory as the *Metasequoia,* and is an almost as interesting but more majestic and more beautiful tree. Its discovery and the discovery of *Metasequoia* prove that there are still botanical treasures to be found in China, even in quite extensively covered regions such as western Hupeh, an area long explored by Professor Augustine Henry, and Wan Hsien, a region repeatedly traversed by Dr. E. H. Wilson and many other European and American botanists.

Since Chinese botanists have taken active part in the botanical exploration and systematic studies of Chinese flora, numerous new discoveries have been made, such as the genera *Pseudotaxus, Nothotsuga, Smithiodendron, Sinojackia, Rehderodendron, Huodendron,* and *Zenia,* all interesting trees, both botanically and horticulturally. Crowning all is the *Metasequoia,* the probable ancestor of the American redwood and the big tree, the "living fossil" discovered in Central China, the most remarkable botanical discovery in the century.

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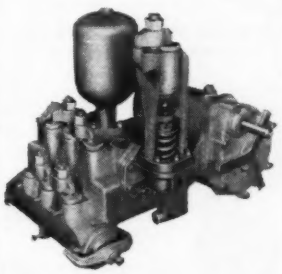

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A part of the crowd at the Milwaukee National Shade Tree Conference last August enjoying the exhibits in the Hotel Schroeder.

N. S. T. C.

(Continued from Page 5)

This course should be continued, said Dr. Marshall, for both the scientist and the arborists are working toward the common end of maintaining shade trees in the best possible condition.

Safety Practices

The final speaker of the afternoon was Karl Kuemmerling, forester to public utilities, Canton, O., who had for his subject, "Safety Practices for Tree Workers." Mr. Kuemmerling stated that accidents are increasing each year among tree workers and quoted figures to prove his contention. Surprisingly, most such accidents result from falls while climbing into the tree. Dead limbs should never be trusted, for they frequently break under the weight of the climber. Slippery ladder rungs constitute another hazard and have been the source of many accidents. Falling objects such as limbs and tools have caused numerous accidents to ground men.

Insecticides

With Dr. Curtis May, president of the National Shade Tree Conference and plant pathologist with U. S. D. A., Beltsville, Md., presiding, the conference reconvened Thursday morning. In this session insecticides and fungicides were discussed, respectively, by Dr. George C. Decker, Illinois State Natural History Survey, Urbana, Ill., and Dr. H. C. Young, Ohio agricultural experiment station, Wooster.

Stating that most of the new popular insecticides were still in the experimental stage of development, Dr. Decker warned that they should be used with extreme caution and never in excess of recommendations. The new materials have increased public interest in insect control, which in some instances have brought undesirably abrupt discarding of old and proved insecticidies in favor of the new chemicals.

DDT, the most popular of the new

(Continued on Page 22)

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Mist Spraying

(Continued from Page 12)

friction, thus by the time the air leaves the container, we find that there are three different pressures to be considered. Namely, air outside container into which the compressed air must pass, a narrow ring of higher pressure at the outer circumference of the high velocity stream and the higher pressure of the high velocity stream itself.

The characteristics of the air stream is controlled by the outer circumference pressure created by the friction of the container or a condition known as skin friction. As the compressed air leaves the container its natural tendency is to expand. The velocity of its travel, plus the density of the outer ring control the distance or the spread of the air stream.

For example, and not using technical terms or figures, we will call the atmospheric pressure outside the nozzle zero, the outer circumference pressure 5 lbs., and the high velocity pressure 10 lbs., and the speed of travel 13,000 ft. per minute. It will be readily seen that while the 5 lb. outer pressure is becoming equal to the atmospheric pressure or zero, that this part of the air stream actually acts as an invisible container for the high velocity air which traveling at 13,000 feet per minute is held together for a considerable distance from the nozzle before it is allowed to expand freely into the area of zero pressure.

Mist sprayers so designed are very well suited to the job of spraying distant objectives such as woodlands and extensive marsh areas.

Now we will take for another example, a larger outlet, say 12" diameter with atmospheric pressure zero, outer circumference 2 lbs., and high pressure 4 lbs., and velocity 9,000 feet per minute, and it will be seen that because of the slower velocity, that even the lower pressure of 4 lbs., will have pushed through the 2 lb. area in time to allow for a much wider spread of the air stream much nearer to the nozzle outlet.

Also, the larger diameter nozzle in our example, having a greater area and discharging a lower pressure air will attain a good distance before the forward moving air has equalized with the atmospheric zero. In other words, while the velocity is slower, the expansive quality of the air stream is less. Machines so designed are ideally suited for individual shade tree work, such as roadside, estates, town and city shade trees, hedge rows, local fly and mosquito control and extensive experimenting is being done at this time to adapt this type of machine to farm crop and orchard work.

There is one other characteristic of air flow not mentioned before and well to be considered and that is turbulence or twisting air.

(Continued on Page 26)

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Beilmann

(Continued from Page 7)

the pull on the upper end (as a result of evaporation) is immediately transmitted through the entire trunk. As a season wears on and less water becomes available to the tree, some of the strands are broken. When they are stretched to the breaking point, a bubble of air enters the column. This is also the way in which portions of an annual ring are converted from conducting tissue to heartwood. It is also the reason why trees wilt so rapidly when attacked by either Phloem Necrosis or Dutch Elm Disease. If the strand is not broken by stretching or cut off by the formation of gums or resins, it continues to function throughout the summer, although the only moisture in the cell at that time may be in the lumen of the cell wall. There is no other adequate explanation for the ascent of sap which has a speed and responsiveness indicated by the author's work, nor which will permit a tree to grow through a hot dry summer when almost the only water in the trunk is "bound" water. This water is present in every living tree, whether scorched by the summer or frozen to inactivity by the cold of winter.

Summary

The Cohesive Tension Theory of Dixon is the only satisfactory explanation for the movement of sap through a tall trunk. The work of Lund and Rosene indicating that electric fields govern the distribution of hormones is a satisfactory explanation of bud opening in spring. Osmosis, long thought of as a conducting mechanism, may be restricted largely to the medullary rays and the adjacent tracheids. Root pressures, in spite of the marvelous gauge readings obtained, cannot overcome "friction loss" in microscopic conduits.

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N. S. T. C.

(Continued from Page 18)

materials, may act as either a stomach or a contact poison. Compared with some of the other insecticides, it is slow in action, though deadly to flies, mosquitoes and many other insects. It has a long-lasting or residual effect particularly when applied to surfaces not exposed to the sun and weather.

Newer Fungicides

In discussing the newer fungicides, Dr. Young stated that progress is being made more rapidly than ever before in developing materials that will combat various fungi effectively. Many of these fungicides contain the chemical component dimethyl dithiocarbamate. To this component may be joined the metallic ions of iron, zinc, copper, calcium, sodium and nickel, all of which are more or less fungicidal.

Diseases and Pests

A lecture illustrated with color slides was delivered by Dr. A. J. Riker, department of plant pathology, University of Wisconsin, Madison, on the subject "Developing Resistance to Disease in Trees." In work which has extended over a number of years definitely encouraging results have been secured. It seems probable that strains can be developed eventually which will be resistant to diseases that are very destructive to the parent species.

Dr. P. P. Pirone, pathologist, New York Botanical Garden, Bronx park, New York city, in speaking on "Troublesome Diseases," told of a new canker affecting London plane trees. Infected trees may die in one to three years. No controls, other than eradication of infected trees, have been developed as yet.

Elm Diseases

"Status of Research on Two Epidemic Elm Diseases" was discussed by Dr. R. R. Whitten, entomologist, U.S.D.A. bureau of entomology and plant quarantine, Columbus, O. The Dutch elm disease, caused by a fungus which was introduced into this country from Europe some twenty-five years ago, is widespread throughout the eastern states and extends westward into Kentucky, Tennessee, Ohio and Indiana, and within the last year has been found in Denver, Colo. One case has been reported from Kansas City, but to date confirmation is lacking.

The principal vector of the disease is the smaller European elm bark beetle, Scolytus multistriatus. Experiments are being conducted with DDT and other insecticides to control these insects and thus prevent spread of the disease. Experiments are also being made to develop hybrid elm trees which are resistant to both the Dutch elm disease and elm phloem necrosis. Results to date have been encouraging.

Elm phloem necrosis, a virus disease, is known to be present in Ohio, Indiana, Illinois, Missouri, Iowa, Nebraska, Kansas, Oklahoma, Arkansas, Mississippi, Tennessee, Kentucky and West Virginia. The disease is carried by a leaf hopper, which in its nymphal form may be identified by a broad white band extending across the body. Experiments are being made with various insecticides to control this insect. In the floor discussion that followed this paper, it was brought out that the use of fertilizer is of no apparent help in preventing or counteracting the effects of elm phloem necrosis, though if properly used it may help combat Dutch elm disease.

At the business meeting, with President Curtis May presiding, it was announced that next year's meeting of the conference would be held at Baltimore, Md. H. S. Clopper, arborist, 2831 Ridgewood avenue, Baltimore, and H. S. Clopper, Jr., of the same firm, were appointed chairman and co-chairman, respectively, of the 1949 meeting.

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Connecticut Defies

(Continued from Page 9)

placed second, and Anthony Presto of Greenwich, third.

In the rope throwing contest, a standard half-inch, 125 foot rope had to be coiled at one end and thrown through a V-crotch, growing somewhat horizontally, 40 feet high. It had to be thrown manually, each contestant permitted three tries. The rope had to go over limb of this 80-foot tall white oak (which is Connecticut's official state tree, incidentally) and return to the ground.

Champion Myder of the Greenwich Tree Department was the only contestant who accomplished the feat within the specified three tries. Second place was won by R. Mandeville of Fennell & Sons of Bridgeport; third by John Calitri of Calitri Bros. of New Haven.

Fascinating as these contests were, they were but one ring of a three-ring circus that day. For the Connecticut Association had prepared a program that covered every possible phase of a tree man's multitude of interests.

A three-pole canvas tent with a capacity of 400 had been pitched up on a grassy knoll just beyond the Bartlett laboratory buildings. It was there that Mr. Fennell, Dr. F. A. Bartlett, founder of the laboratories, chairman of the board of the F. A. Bartlett Tree Expert Company, and one of the charter members of the Association, and Dr. Rush P. Marshall, director of the laboratories, welcomed the association.

The laboratories, Dr. Marshall explained, were not merely the buildings in which the scientific staff worked but the some 1,200 varieties of trees and major shrubs on the 200-acre grounds constantly used for research and investigation in cooperation with all members of the Bartlett company.

There were arborists, tree experts and scientists in attendance not only from Connecticut, but New York, New Jersey, Pennsylvania, Maryland, Rhode Island, Massachusetts and New Hampshire.

Dr. John C. Shread of the Connecticut Agricultural Experiment Station, the first speaker, talked on Japanese beetle control. He said chlordane was very promising, but emphasized that the use of DDT was preferred.

Dr. Roger B. Friend, Connecticut state entomologist, acted as moderator of the panel discussion by entomologists that followed. Taking part were Dr. William Wilford of the U. S. Department of Agriculture—expert on the Dutch elm disease—of East Orange, N. J.; Dr. Ray Brown of the U. S. Department of Agriculture's bureau of research at New Haven; Dr. Samuel Potts of the Department of Entomology at New Haven; Dr. Schread, and Dr. Stanley W. Bromley, entomologist of the Bartlett laboratories.

Dr. Ray Hirt, professor of pathology

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of the New York State College of Forestry at Syracuse, conducted a panel discussion by pathologists. Those participating were Dr. P. P. Pirone of the New York Botanical Gardens, Dr. O. N. Liming of the U. S. Department of Agricultureal Experiment Station; Dr. Albert Feldman of Rhode Island State College, Dr. Marshall, and Nestor E. Caroselli, associate pathologist of the Bartlett laboratories.

Oscar B. Warner of Waterbury was invited to sit in on this panel because of his wide experience in mist blower control.

During the afternoon, Dr. Dimond demonstrated the application of oxyquinoline benzoate as a preventative measure for Dutch elm disease, a subject of great significance to the Connecticut tree men and arborists because of the growing severity and spread of the disease. Dr. Dimond applied the solution to the roots by means of subirrigation.

The field demonstrations were actually the third ring of the circus-like show. Capping them were demonstrations of power saws and other equipment used by tree experts—some of the equipment being shown for the first time.

It was quite a show. Everyone had a chicken dinner—half a chicken each—served by a catering meals on wheels firm. Robert Bartlett, production manager of the Bartlett company, was chairman of arrangements for the meeting. He and George M. Codding, vice president of the Bartlett company were all over the grounds constantly as liaison to the press and photographers.

William Luckner, vice president of the Connecticut Association, was busy as a beaver assisting President Fennell who conducted everything with quiet efficiency. Johnny Woodruff, Association secretary, managed to take time out from handling registration and other paper work to grab a bite of food. They were busy, busy men.

As a result, it was a tree protective association meeting unsurpassed in color, sustained interest and worthwhileness.

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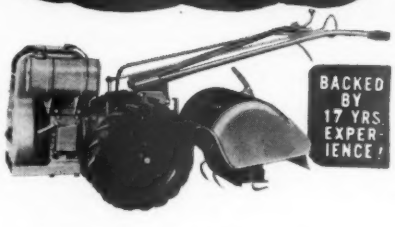

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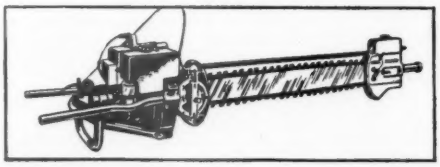

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—State Department of Forest Conservation.

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—State Department of Forestry.

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Authors and Books

The following books may be ordered from TREES Magazine, Box 5607, Cleveland, Ohio.

Maintenance of Shade and Ornamental Trees (Second Edition) by P. P. Pirone. Oxford University Press. 436 pgs., illus.

The long awaited second edition of Pat Pirone's valuable book is off the press. It is too bad the paper used in this edition was not comparable to that used in the first. Much life is lost when cuts appear on a dull paper. Sorry this came too late for a full review but we will defer it until the December issue.

NAA News

(Continued from Page 14)

Union Savings Bank, Danbury, Conn.; R. M. Weakly, Warren, Penna.

This committee is to devise a suitable formula for arriving at a charge to clients for services that will give the arborist a fair profit and be just to the client.

New Members

The following companies have become members of The National Arborist Association during the past few weeks:

Sutherin Bros., Marshall Sutherin, 1713 Lockett Pl., Memphis, Tenn.; Messer Brothers, Marlen Messer, Cedar Rapids, Iowa; Kene Lohrman, 537 30th St., Canton, Ohio; Wilson Tree Co., Inc., H. C. Wilson, Shelby, N. C.; Smith Tree Service, Inc., Edwin E. Smith, 5011 Lafayette St., Lansing, Mich.; Erwin Tree Experts, Howard H. Erwin, 127 Hamilton St., Roanoke Rapids, N. C.; Bergeron's Tree Surgeons, A. W. Bergeron, 2914 Michigan Ave., Niagara Falls, N. Y.; Chester Valley Tree Experts, Melvin E. Pierce, 325 W. King St., Pottstown, Pa.; B. R. Prichard Tree Service, Benjamin Prichard, 120 N. Grand Ave., Poughkeepsie, N. Y.; Mosier Tree Experts, Carl H. Mosier, 908 Westminister Pl., Dayton, Ohio; Bonded Tree Specialists, Inc., W. Hensyl Bardo, 54 Curtis Ave., White Plains, N. Y.; John J. Cornery, 2217 Douglas St., Rockford, Ill.; Frank O. Anderson, Martin Rd., Erie, Pa.

Mist Spraying

(Continued from Page 20)

There is a wide difference of opinion at this time regarding turbulence. Take a string for example, and stretch it taut and you will span the greatest distance possible with that piece of string. Twist the string and you lose distance. So it is with air. Keep the air straight and less air will reach a greater distance. Twist the air and the atmospheric displacement is greater at close range. There are many arguments pro and con as to the merits of straight and turbulent air. However, field tests to date do not place one better than the other except as before mentioned.

(To be continued)

Society of American Foresters To Hold National Meeting In Boston

The annual meeting of the Society of American Foresters will be held December 16-18 in Boston, Mass., at the Statler Hotel. An attendance of 500 members and guests is anticipated.

According to Clyde Martin of Tacoma, Wash., president of the Society, the national meeting will open on December 16 with individual sessions of the Society's nine divisions having to do with private forestry, forest economics, forest recreation, forest products, forest education, wildlife management, range management, silviculture, and public relations. Nonmembers interested in these fields of specialization are welcome to attend any of the sessions.

At the final session on December 18, technical papers on forest practices in the Northeast will be given by representatives of federal and state governments and the forest products industries.

Organized in 1900, the Society has a membership of 6,000 technically trained foresters in the United States and Canada. The JOURNAL OF FORESTRY, a professional monthly magazine devoted to all branches of forestry, is the official publication. The Society's headquarters is in Washington.

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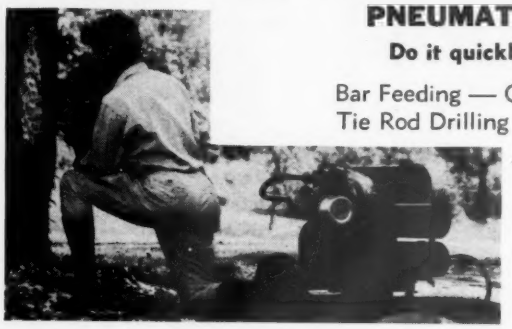

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DR. RUSH P. MARSHALL, Director of the Bartlett Tree Research Laboratories, recently announced the preliminary results of study and field observation of a white root rot which gives indication that it may be a possible cause of White Pine Blight.

This subject is of such importance and general concern that we have received many requests for copies of Dr. Marshall's findings.

This, and other articles directly concerning pests and diseases of pines have been printed in our latest edition of Scientific Tree Topics, Vol. 1, No. 9; we will be very pleased to send a copy of this booklet to anyone who requests, and sincerely hope that this information which, as are all findings of our Laboratories, is made available to all, will contribute helpfully to the ever-continuing struggle of science to protect the nation's trees.

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